

## CLAIMS

What is claimed is:

1. A method for rectilinearizing image data from a microarray comprising a  
5 double-density, non-rectilinear set of microarray features having a non-rectilinear, outermost, feature position arrangement, the method comprising:  
constructing a feature-coordinate system to determine feature positions in the image data; and  
based on the determined feature positions, adding one or more imaginary  
10 feature positions to the non-rectilinear, outermost, feature-position arrangement to form a rectilinear, outermost, feature-position arrangement of the microarray features.
2. The method of claim 1 further includes orienting the image of the microarray so that a corner feature is located in the top, left-hand corner of the image of the  
15 microarray, and a corner feature is located in the bottom, right-hand corner of the image of the microarray.
3. The method of claim 1 wherein constructing the feature coordinate system further includes superimposing horizontal and vertical grid lines onto the image so  
20 that each feature of the microarray is located at a unique intersection of the horizontal and vertical grid lines.
4. The method of claim 1 wherein adding one or more feature positions further includes:  
25 selecting three corner-feature positions of microarray features; and  
determining four feature positions that provide the four feature corners of a rectilinear, outermost, feature-position arrangement of the image of microarray features based on the three corner-feature positions.
- 30 5. The method of claim 4 wherein selecting the three corner features further includes selecting the three corner features automatically using a computer program.

6. The method of claim 4 wherein selecting the three corner features further includes selecting the three corner features manually.
7. The method of claim 4 determining the four feature positions further includes:  
5 partitioning the microarray having a non-rectilinear, outermost, feature-position arrangement into a first lattice having a rectilinear, outermost, feature-position arrangement and a second lattice having rectilinear, outermost, feature-position arrangement; and  
determining whether a selected corner-feature position is a corner-feature  
10 position in the first lattice or a corner-feature position in the second lattice for each of the three selected corner-feature positions.
8. The method of claim 7 wherein determining four feature positions further includes determining the one or more feature positions defining the rectilinear,  
15 outermost, feature-position arrangement of the microarray of features based on the determination of whether each of the three selected corner-feature positions belong to the first lattice or the second lattice.
9. Transferring results produced by a microarray scanner or microarray data  
20 processing program employing the method of claim 1 stored in a computer-readable medium to an intercommunicating entity.
10. Transferring results produced by a microarray scanner or microarray data  
25 processing program employing the method of claim 1 to an intercommunicating entity via electronic signals.
11. A computer program including an implementation of the method of claim 1 stored in a computer-readable medium.
- 30 12. A method comprising forwarding data produced by using the method of claim 1.

13. A method comprising receiving data produced by using the method of claim 1.
14. A microarray scanner that employs the method of claim 1 to rectilinearize a set of microarray features having a non-rectilinear, outermost, feature-position arrangement.
15. A system for processing a multi-channel, double-density, non-rectilinear set of microarray features data set, the system comprising:  
a computer processor;  
one or more memory components that store microarray feature data points;  
and  
a stored program executed by the computer processor that constructs a feature-coordinate system to provide feature positions, and adds one or more imaginary feature positions to the non-rectilinear, outermost, feature-position arrangement to form a rectilinear, outermost, feature-position arrangement of the microarray features.
16. The system of claim 15 wherein constructs the feature coordinate system further includes superimposition of horizontal and vertical grid lines onto the image so that each feature of the microarray is located at a unique intersection of the horizontal and vertical grid lines.
17. The system of claim 15 wherein adds one or more feature positions further includes:  
selects three corner-feature positions of microarray features; and  
determines four feature positions that provide the four feature corners of a rectilinear, outermost, feature-position arrangement of the image of microarray features based on the three corner-feature positions.
18. The system of claim 15 determines the four feature positions further includes:  
partitions the microarray having a non-rectilinear, outermost, feature-position arrangement into a first lattice having a rectilinear, outermost, feature-position

arrangement and a second lattice having rectilinear, outermost, feature-position arrangement; and

5 determines whether a selected corner-feature position is a corner-feature position in the first lattice or a corner-feature position in the second lattice for each of the three selected corner-feature positions.

10 19. The system of claim 18 wherein determines four feature positions further includes determination of the one or more feature positions defining the rectilinear, outermost, feature-position arrangement of the microarray of features based on the whether each of the three selected corner-feature positions belongs to the first lattice or the second lattice.